# FAMILY LYCEUM.

PUBLISHED WEEKLY, AT THE LYCEUM PRESS, No. 3, CORNHILL, BY GEORGE W. LIGHT & Co.

VOL. I. BOSTON, SATURDAY, MAY 4, 1833. No. 38.

## FAMILY LYCEUM.

JOSIAH HOLBROOK, EDITOR.

TERMS: Two dollars a year, in advance. Six copies for ten dollars.

## VOLCANOES.

CHANGES, PRESENT STATE, AND PICTURESQUE SCENERY OF MOUNT ETNA.

[Continued from the last Lyceum.]

HAVING passed this place, and recovered by degrees my former presence of mind, in less than an hour I arrived at the utmost summit of Etna, and began to discover the edges of the crater; when our guides, who had preceded me at some distance, turned back, and, hastening towards me, exclaimed in a kind of transport, that I never could have arrived at a more proper time to discover and observe the internal part of this stupendous volcano. The reader will easily conceive, without my attempting to describe it, how great a pleasure I felt at finding my labors and fatigue at length crowned with such complete success. This pleasure was exalted to a kind of rapture, when I had completely reached the spot, and perceived that I might, without danger, contemplate this amazing spectacle. I sat down near the edge of the crater, and remained there two hours, to recover my strength after the fatigues I had undergone in my journey. I viewed with astonishment the configuration of the borders, the internal sides, the form of the immense cavern, its bottom, an aperture which appeared in it, the melted matter which boiled within, and the smoke which ascended from it. The whole of this stupendous scene was distinctly displayed before me; and I shall now proceed to give some description of it, though it will only be possible to present the reader with a very feeble image, as the sight alone can enable him to form ideas at all adequate to objects so grand and astonishing.

The upper edges of the crater, to judge by the eye, are about a mile and a half in circuit, and form an oval, the longest diameter of which extends from east to west.—As they are in several places broken, and crumbled away in large fragments, they appear as it were indented, and these indentations are a kind of enormous steps, formed of projecting lavas and scoriæ. The internal sides of the cavern, or crater, are inclined in different angles in different places. To the west their declivity is slight: they are more steep to the north; still more so to the east; and to the south-east, on which side I was, they are almost perpendicular. Notwithstanding this irregularity, however, they form a kind of funnel, large at the top, and narrow at the bottom, as we usually observe in other craters. The sides appear irregularly rugged, and abound with concretions of an orange color, which, at first, I took for sulphur; but, afterwards, found to be the muriate of ammonia; having been able to gather some pieces of it from the edges of the gulph. The bottom is nearly a horizontal plane, about two thirds of a mile in circumference. It appears striped with yellow, probably from the above-mentioned salt. In this plain, from the place where I stood, a circular aperture was visible, apparently about five poles in diameter, from which issued the larger column of smoke, which I had seen before I arrived at the summit of Etna. I shall not mention several streams of smoke, which arose like thin clouds from the same bottom, and different places in the sides. The principal column, which at its origin might be about twenty feet in diameter, ascended rapidly in a perpendicular direction, while it was within the crater; but, when it had risen above the edges, inclined towards the west, from the action of a light wind; and, when it had risen higher, dilated into an extended but thin volume.—This smoke was white, and, being impelled to the side opposite that on which I was, did not prevent my seeing within the aperture; in which, I can affirm, I very distinctly perceived a liquid ignited matter, which continually undulated, boiled, and rose and fell, without spreading over the bottom. This certainly was the melted lava which had arisen to that aperture from the bottom of the Etnean gulph.

The favorable circumstance of having this aperture immediately under my view, induced me to throw into it some large stones, by rolling them down the steep declivity below me. These stones, which were only large pieces of lava that I had detached from the edges of the crater, bounding down the side, in a few moments fell on the bottom; and those which entered into the aperture, and struck the liquid lava, produced a sound similar to that they would have occasioned, had they fallen into a thick tenacious paste. Every stone I thus threw struck against and loosened others in its passage, which fell with it, and in like manner struck and detached others in their way, whence the sounds produced were considerably multiplied. The stones which fell on the bottom rebounded, even when they were very large, and returned a sound different from that I have before described. The bottom cannot, therefore, be considered as only a thin crust, since, were it not thick and solid, it must have been broken by stones so heavy falling from so great a height.

To satisfy one emotion of curiosity, is frequently to excite another. I had, at first, approached this volcano with a kind of superstitious awe. The histories of every age, the relations of travellers, the universal voice of Europe, had all contributed to inspire those who should adventure to visit it with dread: but as at this time it seemed to have laid aside its terrors, and was in a state of perfect calmness and tranquillity, I was encouraged to become more familiar, and to endeavor to pry into more of its secrets. I have already observed that the side of the crater to the west is of a more gentle declivity than the others; and I, therefore, conceived that this might serve me as a ladder to descend to the bottom; where I might have added to the observations I had already made, other novel and important facts. But the persons whom I had brought with me as guides would not consent that I should expose myself to such danger. They could not, however, prevent me from making, at my ease, the observations I have here published, and walking leisurely about the summit of the mountain, notwithstanding the dangerous consequences with which they threatened me; telling me that, should the wind change, the column of smoke must be turned towards us, and might deprive us of life by its pestilential fumes; that, besides, we were not certain that the lava at the bottom, which now appeared so calm and still, would long remain in the same state; but that it was possible, from circumstances difficult to foresee, that it might be thrown up on a sudden, and punish our imprudent curiosity by burying us beneath the fiery ruin; in support of which suggestion they produced several instances of sudden and most unexpected eruptions.

We have seen above, that there were two columns of smoke arising from Etna. It is to be remarked that, besides that point of mount Etna on which I stood, there is another to the north, a quarter of a mile higher, and which renders the summit of Etna properly bifurcated. Within the first prominence is sunk the crater I have described; and on the side of the other is the second, from which ascends a lesser column of smoke. The second crater is smaller by about the one-half than that I have already described; and the one is separated from the other only by a partition of scoriæ and accumulated lava, which lies in the direction of from east to west. I made my observations on this second crater from a small distance; but it was impossible to advance to it, on account of the numerous and thick streams of smoke by which it was surrounded. This, however, was no great disappointment, after having seen and examined the principal crater, which is that whence several currents of lava had issued in 1787. I ought, certainly, to consider myself as extremely fortunate, in being able to gratify my curiosity with so near and distinct a view of the objects I have described; as the guides assured me, that, among all the times when they had conducted strangers to the summit of Etna, this was the only one in which they had a clear and undisturbed view of the internal parts of that immense gulph. After my return to Catania, the Chevalier Gioeni likewise declared to me that, in all his different excursions to that mountain, he had never had a good fortune similar to mine; and that, a month before my arrival, he had made a journey to Etna, with the Chevalier Dangios, furnished with the necessary instruments to ascertain accurately the height of the mountain; but when they had arrived at the foot of the cone, where they had proposed to begin their operations, they were obliged to return back from the obstacles they met with, which, to say the truth, are commonly neither few nor small.

Etna rises to a prodigious height above the level of the sea, and its summit is usually covered with snows and ice, and obscured with clouds, except when the latter are low and range along the sides. The winds, likewise, frequently blow with such violence that persons can scarcely keep their feet, not to mention the acute cold which benumbs the limbs. But the most formidable impediments to the progress of the adventurers who attempt this perilous journey, are the streams of sulphureous vapour which rise on the sides, and the thick clouds of sulphureous smoke which burst forth from the mouth of the volcano, even when not in a state of agitation. It seems as if nature had placed these noxious fumes as a guard to Etna, and other fiery mountains, to prevent the approach of curiosity, and secure her mysterious and wondrous labors from discovery. I should, however, justly incur the reproach of being ungrateful, were I not to acknowledge the generous partiality she appeared to manifest towards me. At the time I made my visit, the sky was clear, the mountain free from snows, the temperature of the atmosphere not incommodious, the thermometer standing at seven degrees above the freezing point (forty-eight degrees of Fahrenheit), and the wind favoring my design, by driving the smoke of the crater from me, which otherwise would alone have been sufficient to have frustrated all my attempts. The streams of smoke I met with in my way were, indeed, somewhat troublesome, but they might have been much more so; though, had our guides conducted us by another road, as, on my return to Catania, I found they might have done, we should have escaped this inconvenience.

It here will not be improper to compare these observations on the crater of Etna with those of Riedesel, Sir William Hamilton, Mr. Brydone, and Count Borch; as such a comparison will shew the great changes which have taken place in this volcano, within the space of twenty years; that is, from the time when it was visited by Baron Riedesel, in 1767, to that of my journey, in 1788. At the time when that traveller made his observations, the crater was enlarged towards the east, with an aperture which now no longer exists. He has not given the measure of its circuit, nor has he mentioned the interior aspect of the crater; probably because he had not seen it, having been, as I imagine, prevented by the quantity of smoke which, he tells us, constantly ascended from it.

It is worthy of notice, however, that at that time there was not at the bottom of the crater the hard flat surface I have described; since the stones thrown into it did not return the smallest sound. Within the gulph itself was heard a noise similar to that of the waves of the sea when agitated by a tempest, which noise probably proceeded from the lava within the bowels of the mountain, liquefied and in motion. We may hence conceive how easily a volcano may begin to rage on a sudden, though before apparently in a state of complete tranquillity; for if we suppose a superabundant quantity of elastic substances to have been suddenly developed in the liquid lava of Etna, either at the time when Baron Riedesel visited the crater, or when I observed it in a state of slight commotion within the gulph, it must immediately have swelled in every part, beating violently against the sides of the caverns in which it was imprisoned, thundering among the deep cavities, and, bursting forth through the sides, have poured out a river of fire; or, should its violence have been there resisted, it would have rushed up within the crater, until it overflowed its brink, and deluged the sides of the mountain with its torrents.

Sir William Hamilton, on the 26th of October, 1769, arrived at the summit of Etna, with great difficulty, on account of the snow he met with in his way, the severity of the atmosphere, the sulphureous vapors, and the violence of the wind. He was unable to view distinctly the lower parts of the crater, being prevented by the great quantity of smoke which issued from it; though, when this smoke was sometimes driven away by the wind, he could discover that the crater was shaped like a funnel, diminishing until it ended in a point; and that this funnel was incrusted over with salt and sulphur. The crater was two miles and a half in circumference.

From the time, therefore, of the journey of Baron Riedesel to that of Sir William Hamilton, the crater must have undergone great changes in its structure; since, if the stones that were thrown into it gave no indications to the ear that they struck against any solid body, it is manifest that there must have been an abyss as well as a funnel; and as the funnel terminated in a point, when it was observed by Sir William Hamilton, it is evident that the flat bottom I have described, and which was about two-thirds of a mile in circuit, did not then exist.

The internal sides of the crater, Sir William Hamilton tells us, were covered with a crust of salt and sulphur: but he does not specify the nature of the former; and though the presence of the latter is not improbable, he might have been led into a mistake by the yellow color, and have taken the muriate of ammonia (sal ammoniac) for sulphur, as I did before I had examined it. Sir William has not told us that he made any examination at all; and it is probable that he judged only from the appearance it presented to his eye.

He observes, lastly, that the crater was two miles and a half in circumference; an estimate which may be made to agree with mine by neglecting the partition which separates the greater crater from the less, and considering them both as one. The sum of the two circumferences, according to the estimate I have given, would not then greatly differ from the measure of Sir William Hamilton. Nothing, likewise, can be more probable, than that among the various changes that have happened to Etna, this partition, by which the great crater is divided into two parts, has been produced.

Omitting the observation of Mr. Brydone, that 'the tremendous gulph of Etna, so celebrated in all ages, has been looked upon as the terror both of this and another life, that it inspires such awe and horror, that it is not surprising that it has been considered as the place of the damned'; and reflections of a similar kind which he has employed; and confining ourselves to what he actually saw on the 29th of May, 1770, we learn from him, that 'the crater was then a circle of about three miles and a half in circumference; that it went shelving down on each side, and formed a regular hollow, like a vast amphitheatre; and that a great mouth opened near the centre.'

From the time of the journey of Sir William Hamilton, therefore, to that of the visit of Brydone, that is to say, within the short space of a year, various changes had happened to this volcano, by the enlargement of its crater, and a spacious aperture formed in its bottom.

Count Borch appears to have wished to exceed the three other travellers in brevity, relative to this subject: since he only tells us that he arrived at the mountain on the 16th of December, 1776, and that the crater of Etna is formed like a funnel. He adds, however, what is worthy of notice, that the summit of Etna is bifurcated, as I observed it to be: a circumstance not noticed by others, Sir William Hamilton even affirming that the summit of the mountain is single; whence we may conclude that one of these summits has been produced since the time of the journey of Brydone, in 1770.

On comparing the above-cited observations, made within the space of twenty-one years, we may perceive how many changes have taken place in Etna during that interval; and as, within that time, the mountain has suffered only two violent convulsions, in the eruptions of 1781 and 1787, it is evident that, even in the state of apparent inaction, it still internally exerts its force.

To these observations it may, likewise, not be without utility to add those of M. D'Orville. He ascended Etna in 1727, and remarked two craters, one larger than the other. The latter he only mentions, but the former he describes at some length. Its circumference was, perhaps, somewhat more than four miles. From it issued clouds of smoke and reddish flames. These, however, did not prevent his approaching to the edge of the gulph; though, to prevent the danger of falling into it, he and his companions fastened themselves to a rope held by three men. On looking into the crater,

they were unable to discern the bottom, on account of the flames and smoke; they only observed that a conical hill, formed of lava, rose in the middle of the crater, the top of which they estimated to be sixty feet below them; and they were able to see, perhaps, about sixty feet lower; where they conjectured the circuit of this hill might be from six hundred to eight hundred feet.

We have here a remarkable circumstance relative to Etna, as it appeared in the time of M. D'Orville, and not observed by any one of the four travellers above cited—I mean the conical hill within the crater.—Every observation, therefore, tends to confirm the inconstancy of the internal configuration and dimensions of this volcano. It is an extinguished forge, which, in proportion to the violence of the fire, to the nature of the fossil matters on which it acts, and of the elastic fluids which urge and set it in motion, produces, destroys, and re-produces various forms. The usual and natural figure of the summit of a volcanic mountain is that of an inverted concave cone within, and one solid and erect without; and such a configuration, in countries which are no longer in a state of conflagration, is one of the most certain indications of the existence of an ancient volcano. This cone, however, is liable to very great changes; according to the greater or less fury of the volcano, and the quantity and quality of the matters ejected. Its internal part, from more than one cause, is exposed to continual violence and change.—[*Gallery of Nature and Art.*

## School Lyceums.

In the following communication, for which we thank the author, are two principles illustrated and proved by experiment, which, though true, and of vital importance to the Lyceum cause, are seldom appreciated, and more seldom put in practice. The principles referred to are, that children can do more than adults, and that a variety of exercises is indispensable to a lasting interest in a Lyceum; and we might add a third, viz. the contributions of ladies, for completing the entertainment.

After an unsuccessful attempt had been made by the adults of F. to establish a Lyceum, the juvenile portion tried their powers and skill—which resulted in great improvement and deep interest, of themselves and their parents and other friends. Similar measures are always followed by similar results. And if *experiment* is of any value, the conclusion may be fairly drawn, that if the children in a hundred schools should make similar attempts, ninety-nine at least would be followed with complete success.

But it ought to be distinctly and constantly borne in mind, that it is neither lectures, composition, debates, nor declamation, that created, and much less sustained the interest, but the whole together. It is not the frame, covering, floors, doors, or windows, but the whole combined, that constitute a commodious house. A variety of exercises is absolutely essential to the objects of a Lyceum in any considerable degree.

The salutary influence of ladies, both by their presence and their contributions, which appeared in the Juvenile Lyceum at F. will be shown wherever they are induced to lend their assistance towards an intellectual repast.

## What can be done?

To the Editor of the Family Lyceum:

Sir—While I attended the last anniversary meeting of the American Institute of Instruction at Boston, a gentleman in private conference remarked to me, 'I often inquire, *what can be done?*' These words fastening upon my own mind, I was daily, though silently, led to make the same inquiry. Returning from the meeting to my school in F——, I proposed to my pupils, who were mostly lads from 10 to 15 years of age, the establishment of a *Debating Society*, or *Lyceum*. Neither of these terms were intelligible—it was strange language to them. Nothing answering to these terms had been witnessed by them in F——. Several gentlemen had made some effort to establish a Lyceum for the adult population; but nothing was accomplished. I now explained to my pupils the meaning of the terms just alluded to, which being done, they voted to organize themselves into a Lyceum, and chose a committee to draft a constitution. The constitution being presented and adopted, about 30 joined, of whom a half a dozen were young misses. Our number has since been more than doubled.

By the terms of the constitution, each member is under obligation to take some part in the exercises of the meeting, which is holden weekly. The prominent exercises of the meeting are four. First, Declamation, half an hour; second, a short Lecture on Natural History, or some other subject of interest, adapted to the capacity of juvenile minds; third, the debate of a question previously given out for contemplation; fourth, original composition, from the young ladies; all of the exercises occupying about two hours and a half.

When we first commenced our operations, very great reluctance was manifested on the part of the boys to engage in debate; and none could stand longer than to throw out one idea at a time. Now, they can talk without embarrassment several minutes.—At first, it was not our intention to admit spectators to our meetings. But the thing had created some excitement, and it was the request of some of the first gentlemen and ladies in the place, that we should have an *exhibition*. We finally consented. But the people were not more satisfied than before. They still urged us to allow them the privilege of attending; in consideration of which we passed an order to admit spectators once a month. At these meetings, our house is crowded to overflowing.—Gentlemen and ladies of the first respectability consider it a *privilege* and quite a *treat* to be admitted to our entertainments.—Some have requested that privilege, living from five to seven miles distant. Thus we see that the popularity of the Lyceum is very great. It has exceeded all my expectations.

That the members of the Lyceum themselves take a very deep interest in the exercises of the meeting, is manifest from the following facts, viz.: First, that nothing but my own absence, has at any time hindered us from having a meeting on the evening appointed; and that, too, of most of the members of the institution. No severe storm could prevent our boys from attending the meeting of the Lyceum.

Second, lads living two miles distant, are as punctual in their attendance as those in the immediate vicinity of the meeting. When at home, I have not known one of them to be absent from the meeting.

Third, it was at one time the earnest request of many of our members to increase our meetings, and have two a week. My remonstrances, however, prevailed to their satisfaction.

Other circumstances might be named, to shew that the members themselves take no ordinary interest in the exercises of the Lyceum: but those already mentioned are sufficient.

But what is the influence of the Lyceum? Generally good, on all classes in the community; especially on the members themselves. In the exercises of declamation, debating, and composition, they have evidently made rapid improvement; which is the natural and necessary consequence of the deep interest which they have taken in these exercises. The subject of debate makes a topic for profitable conversation through the community. The boys are less disposed to idle away their time, and spend their evenings at play in the streets, than they have been. They are now studious, and get their lessons better than they have done heretofore. They are more pleasant in school, and are much more easily governed. There can be no doubt in my own mind, but that the Lyceum in a variety of ways has had a fine effect on my school.

But why is it that there is so much interest in the Lyceum? and how is it that this interest is kept up from month to month? and why does it not decline in effort, as institutions of this character are wont to do? Is it because our lads have made great attainments in knowledge? Their advantages for improvement have not been extraordinary. Boys in almost any country village can do the same that we have done. Is it then because we have had a lecture, or one of our exercises? With a lecture alone, our boys long before this would have been scattered to the four winds. Is it on account of our debate? Debating Societies cannot long be interesting to those who do not take an active part in them. Our young ladies, and some others who do not take a part in debate, had before this forsaken us, if that had been the only exercise. Is it then Declamation, or Composition, that has caused us to value so highly this institution? I have heretofore found it a most difficult thing, to excite and maintain any thing like a proper interest in either of these exercises. It is not, then, either of the exercises of the Lyceum alone, which has had such an enchanting influence over our minds; but it is a combination of these exercises, which has elevated the institution in our estimation.

I have had occasion to admire the machinery of our establishment; for it is a self-moving machine. By the terms of the constitution, every one must be active. We allow no drones to remain long in the hive. It is seen that we have a variety of exercises. Hence there is an opportunity for a choice. If any one takes an active part in either, he answers the demands of the constitution. None are restricted to one exercise, but the young ladies.

This I think is the only firm foundation, on which institutions of this character can be permanently based; that is, to make them self-moving machines, and make every part work.

I have noticed, that the influence of our young ladies is very important in the Juvenile Lyceum. They operate as a regulator to this machine. It is often the case that a question comes up in which the lads take a particular interest, and frequently a clashing of interests; and in their zeal for their own cause, the strongest party, though in the wrong, would carry their points, to the injury of the institution. Now the influence of the young ladies comes in, to *set things to rights*. They not feeling a very particular interest in the subject of debate, are prepared to judge calmly and deliberately, and almost always vote on the right side of the question, and thus are the means of checking that part of the machine which would run too fast, and of quickening the wheels that would move too tardily.

## Western Colleges.

In most of our older colleges, few if any attempts are made to bring their courses of instruction to bear directly on the intellects or the hearts of the *great mass* of the community.—We are truly rejoiced to find that it is not so in the colleges rising into respect and influence in the 'Great West.' From a personal acquaintance with the President and Professors of Illinois College, and several others in the western valley, we have had an opportunity to know that *universal education*, the intellectual and moral culture of the great mass, is their prominent object.

As one proof among others of a similar character and almost daily occurrence, that this republican and christian object holds the first place in the minds and hearts of the patrons of Education at the west, we subjoin some letters recently received from the Officers of the Illinois College, which, though intended for private correspondence, can hardly fail of being useful to the public, and therefore hope the writers will pardon us for using them in our columns.

*Illinois College, April* 3. 1833.

Mr. Holbrook,

Dear Sir—I have been appointed by the Illinois State Lyceum to read at its meeting in August next, a dissertation on *School Agencies*. It is a subject in which I have felt a deep interest, ever since I noticed the formation of the 'School Agent Society.' In this day of excitement, and scheming, and improvement too, it is perhaps not *wonderful* that a great many bubbles are blown up that daggle awhile and burst—but that it is a matter of fact is beyond denial—and with some minds it seems to be a matter of course, to fall in with every new plan that is set on foot in the department of education, morals or religion—and without examination put it in motion as one of the happy and important discoveries of this wonder working age. When the human intellect is under such powerful excitement as at the present day, it is to be expected that strong tendencies to *theorising* will be developed—and for that very reason there never was a day when the friends of mental illumination, and moral culture were more urgently called upon to subject *every new plan* for the promotion of either of these or any other object to the most rigid scrutiny, before giving them the sanction of their opinion or example. To such an examination I am anxious, (for my own satisfaction at least) to subject the plan or plans proposed by the 'School Agent Society.' I am not at present prepared to pronounce with confidence on their practical results—I confess that the thing has from the first struck my mind with a great deal of force, and my *impressions* are all favorable. It had appeared to me all along, that I could discover the *disjecta membra*, of a system which when constructed would tell most powerfully upon the interests of the Valley, and indeed upon the interests of the world. The treasures of knowledge should be unlocked to all, and be made as free as the showers of heaven, or the atmosphere that we breathe. But how can this be accomplished unless we adopt some more rapid and less expensive methods of communicating knowledge than have existed in years that are past? I have read with interest the Circular of the School Agent Society—and my object in writing at this time is to request you to furnish me with any additional information respecting the *plan* or *operations* of your society, or respecting the great object which called it into existence. So far as I am acquainted with the sentiments of the friends of education in this region, (all of whom judge from the main features of the plan), it is one not only practicable, but capable of such modifications, as to render it in a peculiar manner adapted to the circumstances of the West. There are other points of interest upon which I should touch, did I not leave them to President Beecher and Professor Sturtevant.—By complying with this request, you will I hope subserve the cause of education in this region, and you will certainly much oblige Yours, &c.

Theron Baldwin.

Dear Sir—I will only add in few words my full conviction of the importance of such an effort as is proposed by the School Agent Society. All agree that something must be done to secure the universal education of the people. Indeed upon the decision of the question, Can this be done? depends the fate of all republics. Governments can do much if disposed; but to give even them their full efficiency, an enlightened public sentiment on the subject is needed, such as can originate only from a system of schools already in existence, as a living witness of the beneficial results of Education. How shall such a system be organized? It must be by voluntary effort. Effort here, however, if unsustained by friendly aid from abroad, will be inadequate to gain the desired end. Teachers are wanted, and cannot be obtained, and often funds to give them a full support. Excite now all who can to act for themselves, and aid them in educating teachers on the spot, and for a time in supporting them, and the work is done. Our great end should be to excite and enable the West to take care of itself in its maturity, by efficient and seasonable aid in the time of its infancy. All that we can do to aid you in your efforts we shall gladly contribute, and some mode of united operation between us and you may perhaps be suggested by Mr. Sturtevant, who has felt and thought much upon the subject, and projected the formation of a Society similar to yours sometime ago.—

I am yours, with much respect,

E. Beecher.

Dear Sir—As I have little room and little time, I shall confine myself to the statement of a few propositions which I consider too evident to need proof to any mind acquainted with the condition of *common intellect* in our country considered as a whole.

1. Unless the standard of common intellect in our land be greatly elevated, the benevolent will be painfully disappointed in the results of all the efforts now making for the moral improvement of our country.

2. A vigorous, thorough, and successful effort to establish schools for elementary instruction wherever they are needed, and to improve those now existing to such a degree as to render them suited to the condition and wants of the youthful mind, is the only plan which can ever elevate the standard of common intellect to the point desired.

3. In order to make such an effort successful, a great number of teachers must be raised up, who shall be in every respect qualified for their business, and who shall make that business a *profession*.

4. These teachers should be, as a main dependence, *selected* and *educated* in the communities where they are to *act as teachers*. Let not the effort be embarrassed by an idea so revolting to the prejudices of the people, as that of depending upon the importation of men from one section of the country for the avowed purpose of enlightening those of another.

5. These teachers should be severally sustained by the benevolent, till they can wake up energy enough in the people for whom they labor to sustain them.

The above, sir, is a frank avowal of my opinions on the general principles of the case. These opinions are purely the result of my own observations: and the idea of such an effort which should be as extensive as the moral wants of this nation and of the world, has long been with me the object of intense thought and feeling, and the subject of a good deal of conversation. It is a plan which, if judiciously laid, and executed with an energy proportioned to its importance, *must* succeed, and pour a tide of blessings not upon our country alone, but upon the *human race*. I will suggest that I have no doubt the Trustees of this Institution will stand ready to cooperate with your Society in the education of teachers. We have an English and Preparatory Department, upon which a Teachers' Department might with great propriety be engrafted.—A considerable number of the students in that department came to the Institution for the express purpose of preparing themselves to be teachers.

Let us hear from you as soon as your numerous and highly useful avocations will permit. I am, Dear Sir, Yours, &c.

J. M. Sturtevant.

### Fishes.

Fishes are a class of creatures that appear both in structure and sagacity quite inferior to other animals; though capable of enduring famine an amazing length of time, they appear most voracious creatures; a ceaseless desire for food seems the ruling impulse of their actions, and their life one continued scene of violence or evasion.

Most fishes present the same external form; sharp at both ends, and bulky in the middle; which shape is most convenient for their passage through the watery element. Mankind have imitated this form in the construction of their marine vessels; but the progress of such machines is far inferior to that of fishes; any of which, will, with ease, outstrip a ship in full sail; play around it, loiter behind, and overtake it.

The instruments of motion in these animals are the fins; of which the general complement is two pair, and three single fins; though some fishes possess more, and many less than this number. The pectoral fins are placed at some distance behind the opening of the gills; and are generally strong and large; answering the same purpose, to a fish, as wings do to a bird in the air; namely, pushing the body forward, like the oars to a boat. They also serve to balance the body of a fish, and prevent the head from sinking, which it would otherwise do. The ventral fins are placed under the belly, towards the lower part of the body; these are always extended flat on the water, in all situations; and serve to rise or depress the body of the animal, rather than assist his progression. The dorsal fin is situated along the ridge of the back, and serves to keep the fish in equilibrium, and also assists it in its velocity. This fin is very large in all the fish; the pectoral fins of which are proportionally less. The anal fin extends from the anus to the tail, and serves to keep the body of the animal upright, or in a vertical direction. In some fishes, as before observed, the tail is horizontal, and in others perpendicular. Thus equipped, these animals have the most rapid motions; and perform voyages of upwards a thousand leagues in one season.

Fish are also furnished with a slimy glutinous matter, which overspreads the whole body, and defends them from the corrosive quality of the water. Beneath this matter, some have a strong covering of scales, which, like a coat of armor, protects the body from injuries. Beneath which, again, there is an oily substance which supplies the animal with the necessary warmth and vigor.

Fishes possess most of the senses, in an inferior degree, of land animals. Their sense of smelling (though furnished with nostrils) is less perfect than in the other parts of animated nature, as must be evident from the nature of the fluid they inhabit: this sense in them can only act from the action of the fluid, tinctured with the odour of the object upon the olfactory nerves within, in the same manner as the palates of other animals discover tastes. Their sense of taste must also be very imperfect; their palate being of a hard bony nature; whereas, in quadrupeds who possess this sense in an exquisite degree, this organ is very soft and pliant. From this indiscrimination, fish will frequently swallow the plummet as well as the bait. Their sense of hearing is still more defective, if they possess this faculty at all, as is evident from the frequent experiments which have been made. No fish, except the whale kind, have the least appearance, on dissection, of any auditory organs. Their sense of sight is, however, somewhat more perfect, though inferior to that of most other animals.—They are totally destitute of eye-lids; the eyes being covered with the same skin that overspreads the rest of the body.

The period to which fishes live, is very little known, though it is generally believed they attain to a considerable age; some of the least exceed in their age that of a man. The method of discovering their ages, is either by examining the transverse coverings of their scales, by means of a microscope, or by the transverse section of the back bone. Buffon found a carp, which by the former method of computation appeared to be a hundred years old, allowing one year for every covering of the scales; the skate and ray, like other fish which have no scales, have their ages discovered by separating the joints of the back bone, and then examining the number of rings which the surface exhibited where it was joined, allowing one year for each ring. Little can be said in favor of the certainty of either of these methods; they, however, though not infallible criterions, enable us to make a near approximation to the truth.

The greatest singularity in fishes, is their amazing fecundity. Some are viviparous, and others oviparous; the latter produce their young, or rather their eggs, in far greater abundance than the former; but at the same time they are more subject to become the prey of other fish, and even of their own species, not excepting the parent itself which exuded them, while they continue in their egg state; consequently but very few of these eggs produce live animals, though produced in such considerable numbers. A single cod will produce above nine millions of eggs in one season; and many other fish have as proportionable an increase.—[*Book of Knowledge.*

---

For the Family Lyceum.

### Hydrogeographical Map.

I have recently seen, and have been much pleased with a Map of a new construction, invented, as I believe, by Rev. Gardner B. Perry, of Bradford. This map goes by the name of Hydrogeographical, or Water Map. Its peculiarity consists in the parts representing the land being raised; that which represents the water, being depressed, with a rim on the outside for the purpose of holding water, or some other liquid—so that the oceans, seas, lakes and rivers become real water, and thus a much more lively and impressive idea of the actual state of the earth is produced in the mind of the learner. On these waters, little miniature vessels are made to sail and to carry their cargoes of produce from one port to another, in every part of the world. In the more perfect maps, the rivers are filled by means of a fountain a little raised, and the waters made actually to flow down the channel—the tide made in some degree, to flow. The mountains are elevated, and various other circumstances in nature, in a striking manner, illustrated. These maps have been used upon trial, in the Merrimack Academy under the care of Mr. Sylvanus Morse for a year or more past, and are found to answer the highest expectation concerning them. A new impulse has been given to the study of Geography, and it is believed, a much more accurate and permanent knowledge is obtained by the students than could, in any other way, have been acquired in the same time. For this invention, Mr. Perry has, or intends, as I am informed, to obtain a copy and patent right, and I think it must be regarded, as among the most happy inventions of modern times, connected with school education.

---

### Geometrical Diagrams.

Since the sheet of Geometrical diagrams was prepared in connection with 'Easy Lessons in Geometry,' two or three years since, many thousands have been used in schools and families. This sheet has recently been improved by the addition of several figures to represent solids, which will also furnish some useful exercises in drawing. It accompanies the apparatus, both for schools and families, and may also be used separate from either. Besides showing the names and forms of the elementary figures in Geometry, the diagrams are designed to illustrate the mensuration of surfaces and solids, such as cloth, land, boards, timber, wood, walls, cisterns, casks, &c. &c., and it is believed they are applicable to a greater variety of the sciences and arts than any thing else which can be found in the same space. The sheet, containing nearly sixty figures designed to be learned by children and imitated on slate and paper, and by cutting them with the scissors or knife, and applied to mensuration of all kinds. Price 12 1-2 cents.

---

Liberal and Judicious Donation.—James Wadsworth, Esq. of Genessee, has placed in the New York Life Insurance and Trust Company, in the name of the trustees, the sum of six thousand dollars to form a fund for the preparation and publication of lectures, to be read in the Common Schools of this State, after having been approved by the Superintendent of Common Schools.—The subjects, we understand, are Natural Philosophy, Chemistry, Political Economy, the Principles of Legislation, Horticulture, Agriculture and Moral and Religious Instruction.—[*Evening Post.*

---

A New Continent.—The London Literary Gazette of Feb. 23d. says, a whaler has fallen in with a continent in the Antarctic seas; and as the discovery is *small*, the owners have endeavored to conceal it, till they can bring off some cargoes of oil and seal skins. The log of the vessel is rather confused; but still there seems to be no doubt of the fact, that an immense tract of land has been found about the latitude 67° and in longitude lying nearly due south of the Cape of Good Hope.

### School Agent Society.

As many of the friends of Education, not only in the Mississippi Valley, but among the delightful New England hills, may wish to be informed respecting the objects, plans, and prospects of the School Agent Society, we will present them briefly in this place.

The object of the Society is to awaken interest and institute measures in the great and common cause of universal education; to do what is in their power to aid in carrying to every man, woman, and child upon our globe, the blessings of intellectual and moral culture; to aid in conducting a whole loaf of the bread of life, where they can, to those perishing under a mental famine, and if not a whole loaf, half a loaf, or at least a crumb. It is the object of the Society to lead to the improvement, if possible, of the schools, especially the common schools, already in operation; to forward the establishment of others; and to furnish some substitutes for daily schools where they cannot be established and sustained.

To forward this benevolent and christian object, one of the first measures proposed by the Society is to procure and aid travelling agents; to invite meetings of teachers, parents, and children, and to show them the ease, as well as the importance of producing the action and the improvement of mind, wherever mind exists—whether in a New England village, the Great Valley of our country and our globe, among the natives of our western forests, or in the deserts of Africa.

It is the opinion of those interested in the Society, that a more direct process may be taken to get access to mind and heart, and to produce intellectual operations and improvement, than the circuitous course of books—the two or three years process of learning letters, syllables, words, sentences, and volumes. They believe that such objects may be presented, even to the most untutored mind, as to elicit thought and feeling the moment they are presented.

By the aid of a globe and map, a wandering savage may be taught many things in geography, much of which he already knows, though he never saw a book or a letter.

By a few diagrams and solids, the most unlettered person in the world might understand and apply many of the principles of geometry.

By a similar direct process, numbers, and even letters, may be so presented to the mind, as to produce an *immediate* action, which is seldom if ever done by the artificial and unnatural process pursued in most schools throughout our country.

We have here time only to call the attention of our readers to the fact, and an important fact it is when viewed in connection with universal education, that wherever mind exists, an *immediate mental action* may be produced, so as to enable that mind to feel and exert its own continued action and progressive improvement.—The mode or modes of doing this will be presented on future occasions.

---

Mechanics Rising.—The Mayor of Boston is a mechanic; the late Mayor of Washington is a printer; the Lieutenant Governor of Massachusetts was a Journeyman pressman; Mr. Burges, M. C. of Rhode Island was a blacksmith; there are three printers in the Senate of Pennsylvania, and six in the House, and at least twenty in the Legislature of Massachusetts.

---

### EVENING ENTERTAINMENTS.

#### EVENING I.

Mr. Oakley's family having assembled round him, prepared to listen anxiously to his recital, which he began thus:

Your lessons in Geography, my dear children, have already informed you of the great difference there is between the countries which compose the four quarters of the globe. Some parts abound in all the richest gifts of nature; such as fruits, flowers, and vegetables; shady groves and gloomy forests; limpid streams and majestic rivers; verdant hills and lofty mountains. Others, on the contrary, present boundless deserts and barren wastes, where vegetation never shows her verdant head; where a burning heat or icy cold appears to render them unfit for habitation. Again, there are some countries which alternately participate of those extremes, and although they can boast of the indulgence of nature's gifts, they are also made sensible of her rigors. Good and evil have been bestowed equally upon these, while other nations bask in the smiles of luxuriance, or wander in the barren fields of necessity.

Yet notwithstanding the variety of climate, we find the greater part of the globe inhabited. The burning deserts of the torrid zone, the tropical climates, the borders of the icy sea, the immense deserts of the interior of Asia; the most distant isles, all countries of the earth present to us inhabitants, who, attached to their native soil, find in it more than sufficient for their wants. Of this, my children, you will be convinced as we traverse the globe in idea; it is to the conviction that industry and labor are necessary to the happiness of man, and that labor, either mental or bodily, is the source from whence all the delights of society spring. In countries, where nature has been prodigal of her bounty, you will sometimes find a people indolent, slothful, and neglectful of her blessings. The human mind without energy, and the end of our being thus perverted, the people are unhappy in the midst of plenty. There are on the contrary, other nations content to be poor and wretched, without making a single effort to ameliorate the severities of their lot, which industry would greatly relieve. While a third class will present to our view the more pleasing picture of man subduing the elements, converting the barren soil into a fruitful garden, and transforming the arid waste into fields of waving golden corn. Blessed effects of Industry! Ah! if mankind would but call forth those abilities and powers which the Almighty has so lavishly bestowed upon them, what a happy world would this be!

*Caroline.* Indeed it would, papa, and we have only to look at the two cottages of Jenkins and Thomson, in our own village, to verify your remark.

*Mr. O.* The application is correct, Caroline, and I am pleased with the observation it evinces; but to proceed with our immediate subject, and as order was heaven's first law, we will arrange a plan for our mental romances without further delay. We will compare the people of the earth to the steps of a ladder; beginning at the bottom of this ladder, we shall treat of the nations least cultivated, and then gradually ascending our imaginary machine, at last reach that step appropriated to the most industrious and enlightened of mankind. Our first researches and studies will offer to our view but dismal pictures. Vice among the savages appears in its most frightful form; yet even amongst them we shall find some traits of character which will console and interest us. If the savage does not conceal his vices, he affects not virtue; and when his finer qualities do appear, we may be convinced of their sincerity; it is not always so in civilized society; for I am sorry to say, that vice frequently appears there, wearing a most amiable mask. Of this, my children, you will have melancholy proof hereafter in your intercourse with the world.

What an enormous distance is there between the savage and the polished European! We must acquaint ourselves with the manner of living of each before we can judge of the efforts and experience necessary to attain a state of civilization. We see savages, such as those of Port Jackson, who have no place of dwelling whatever, who stretch themselves upon the ground where fatigue or night overtakes them, and with no covering but the canopy of heaven, no bed but the bare earth, stretch out their weary limbs upon the green sod, or amid the branches of a tree find a place of repose. Others again, more sensible to the injuries of the air, find a refuge in caverns, or in pits dug out of the earth. The greater part of savages are wholly without covering, except what vanity, that never-failing and extensive feeling, dictates.

The Californians, when they have appeased their thirst and hunger, repose themselves upon the burning sand like brutes, and there remain for days together; a disgusting dirtiness reigns throughout the dwellings of the savage as well as in their food. The inhabitants of Paraguay eat, or rather devour all animals they can seize; lions, tigers, serpents, and even the most venomous beasts.

The Anacanais in India eat raw fish, rabbits, rats, and mice. The same custom is observed in Patagonia, and upon the Straits of Magellan. The Samoides and the Tonquins, like wild beasts, suck, with avidity the blood of the animals they have just killed. These are the excesses of savage life.

---

Manual Labor School, Camden Co. Ga.—In a letter from Steele, Principal of this School, dated Langsbury, April 4, we learn that 'success [thus far] has equalled his most sanguine expectations.'—'I am' he says 'more and more convinced, and that it will become universally prevalent. We have now many more applicants than we can accommodate.'—[*Charleston Observer.*

## BOOK OF NATURE.

### USES OF THE FIXED STARS.

'Ask for what end these heavenly bodies shine,
Earth for whose use?—Pride answers, 'tis for mine.'

'But do these worlds display their beams, or guide
Their orbs to serve thy use, to please thy pride;
Thyself but dust, thy stature but a span,
A moment thy duration! foolish man:

As well may the minuest emmet say,
That Caucasus was raised to pave his way;
The snail, that Lebanon's extended wood,
Was destined only for his walk and food:
The vilest cockle, gaping on the coast
That rounds the ample seas, as well may boast
The craggy rock projects above the sky,
That he in safety at its feet may lie;
And the whole ocean's confluent waters swell,
Only to quench his thirst, or move and blanch his shell.

As every part of the vast machine of the universe seems wisely made in some degree or other subservient to the whole, notwithstanding the vast distances of the stars from the earth, it would be extremely improper to deny that they may be to a certain extent useful to man. How often do they serve to cheer the gloom of the midnight sky when neither sun nor moon appears. In the early ages those who went down to the sea in ships had scarce any other sure guide for their wandering vessel. They still serve to direct the benighted traveller in his solitary journey: and by means of the revolutions of the stars, the ploughman, even had he no other directory, would know exactly when to plough his fields and sow his seeds. But if, as we have seen, the stars bear such a striking analogy to the sun in their magnitude, their nature, and some of their properties, have we not reason to conclude that they have far more important offices to fulfil than merely to be useful in a few respects to man; that they also, like the sun, are each the centre of its respective system. But where does this reasoning lead us? for if the stars are suns, and centres of other systems than that to which our earth belongs, does it not naturally follow, that there must be other worlds revolving around them? and if other worlds must they not also be inhabited? This is a humiliating lesson to the sons of pride, who have indulged the thought that every thing in the universe was intended chiefly for their use; but it is not to be supposed, that the Omnipotent Creator, who has not a leaf or drop of water unpeopled, should have left such immense bodies destitute of inhabitants.—'It is surely much more rational to suppose them the abodes of intelligent beings; of beings endowed with capacities of knowing, loving, and adoring their Creator: provided and blessed with every object conducive to their happiness; many of them, perhaps, in a far greater state of purity than the inhabitants of our earth; in possession of superior degrees of bliss; and all under the direction, indulgence, and protection of infinite wisdom and goodness;' so that the poet is correct in his reasoning:

'What read we here?—existence of a God?
Yes; and of other beings, man above;
Natives of æther! sons of higher climes!'

In this view of the subject, what a grand and magnificent spectacle does the starry heavens present? What lofty and enlarged idea must it give of the Deity, to suppose every star which we behold a sun, and each sun the centre of its respective system, of planets and comets moving within the sphere of its attractive energy, and irradiated by its beams. Must not such a consideration inspire us with the grandest and most sublime ideas of that Being, who has not only formed but launched forth those numerous orbs into the immensity of space, and who preserves them in the greatest order and regularity, so that there is not the least danger, nor the smallest possibility of their running into confusion; but to stretch our imagination still farther beyond the boundaries of the visible creation, and to suppose other stars, and consequently other suns and systems of inhabited worlds, moving in the same beautiful order and regularity beyond these, how awful the thought! how overwhelming the consideration! What an august, what an amazing conception does this give of the works of the Creator! Thousands of thousands of suns multiplied without end, and ranged all round us at immense distances from each other, attended by ten thousand times ten thousand worlds, all in rapid motion, yet calm, regular, and harmonious, invariably keeping the paths prescribed them; and these worlds doubtless peopled with myriads of beings, formed for endless progression in perfection and felicity!

'Not only this which we by custom call
Our world, the stars embellishing the skies
Are worlds alike, th' Almighty rules them all,
And all at first from matter's mass did rise.'

Thus we see, that the great Creator of the Universe, like gold well tried in the furnace of the refiner, rises more august, more grand, more sublime, more inexpressible, beyond what our finite capacities can conceive, or our tongues express, the more we extend our researches into nature;—that 'the works of the Lord are indeed great, in proportion as they are sought out, of all them that have pleasure therein;' while Man, an atom of an atom world, dwindles into insignificance as he becomes sensible of his own imperfections and weakness; and even the most devout and diligent student of nature, while he is forced to exclaim as he contemplates the wonders of the skies, 'The heavens declare the glory of God, and the firmament sheweth his handy work,' is also obliged, from a sense of his own littleness, when put in competition with those mighty orbs, to adopt the following beautiful sentiment; 'When I consider the heavens the work of thy fingers; the moon and the stars which thou hast ordained: What is man that thou art mindful of him? and the son of man that thou visitest him?'

### NATURAL APPEARANCES

#### IN JANUARY.

'Stern Winter's icy breath, intensely keen,
Now chills the blood, and withers every green.
Bright shines the azure sky serenely fair,
Or driving snows obscure the turbid air.'

Civilized nations in general have agreed to date the commencement of the year on the first of January, within a few days after the winter-solstice, or shortest day, which takes place on the 21st or 22d of December. In the month of January the weather in the British Islands is commonly either a clear dry frost, or fog and snow occasionally intermingled with rain. Nothing can be more wonderful than the effects of frost, which, in the space of a single night, stops the running stream in its course, and converts the lake that was curled by every breeze, into a firm plain. This property of frost produces a beneficial effect to the farmer; for the hard clods of the ploughed field are loosened and broken to pieces by the swelling of the water within them when it freezes, and thus the earth is prepared for receiving the seed in spring; while

——'The frost concocted glebe,
Draws in abundant vegetable soul,
And gathers vigor for the coming year.'

Numerous natural phenomena are produced by frost.—Water from the clouds freezing slowly crystallizes in little icy darts or stars, forming by their assemblage the beautiful flakes of *snow*. Its whiteness is owing to the smallness of the particles into which it is divided; for ice, when pounded, becomes equally white. Snow is very useful by protecting the plants it covers from the severity of the frost.—*Hail-stones* are drops of rain suddenly congealed into a hard mass, so as to preserve their figure.—They often fall in warmer seasons of the year, as even then the upper regions of the atmosphere are very cold. When *dew* or *mist* freezes, as it frequently does on every object on which it falls, it becomes *hoar-frost*, producing figures of incomparable beauty and elegance.

As the cold of this inclement season advances, the birds collect in flocks, and, rendered bold by want, approach the habitations of man. The wild quadrupeds also are driven from their accustomed haunts; hares enter the gardens to browse on cultivated vegetables, and, leaving their tracts in the snow, are frequently hunted down or caught in snares.

The domestic cattle now require all the care and protection of the farmer. Sheep are often lost in the sudden storms by which the snow is drifted into hollows, so as to bury them a considerable depth beneath it; yet they have been known to survive many days in this situation. Cows receive their subsistence from the provision of the farm-yard; and early lambs are kept within doors, and tended with nearly as much care as the farmer's own children.

'Now shepherds, to your helpless charge be kind;
Baffle the raging year, and fill their pens
With food at will; lodge them below the storm,
And watch them strict; for from the bellowing east,
In this dire season, oft the whirlwind's wing
Sweeps up the burden of whole wintry plains
At one wide waft, and o'er the hapless flocks,
Hid in the hollow of two neighboring hills
The billowy tempest whelms.'

The plants at this season are defended by nature from the effects of cold. Those called *herbaceous*, which die down to the root every autumn, are safely concealed under ground; and the shrubs and trees that are exposed to the open air, have all their soft and tender parts closely wrapped up in buds, which, by their texture, resist the effects of frost, and are hence aptly termed the winter quarters of the young shoots. How admirable is the economy of Nature.

The earth, at this season, may now be compared to a mother who has been robbed of those children from whom she had the best hopes. She is desolate and deprived of the charms which varied and embellished her surface: however, she is not robbed of all her children; here and there some vegetables are still to be seen, which seem to defy the severity of the winter; here the wild hawthorn shows its purple berries and the laurestina displays its blossoms in clusters, crowned with leaves which never fade. The yew-tree rises like a pyramid, and its leaves preserve their verdure. The ivy, evergreen, still creeps along the walls, and clings immovable, while the tempest roars around it. The laurel extends its green branches, and has lost none of its summer ornaments; and the humble box shows here and there, in the midst of the snow, its evergreen branches.

---

### FUEL.

Heat is artificially obtained for common purposes, by the combustion of fuel. Fuel may usefully be considered with regard to its compactness or weight, its quantity of combustible matter, and its quantity of water.

## NATURAL HISTORY.

### CONVERSATION I.

'WELL, boys, this is a beautiful day. The sun is shining brightly, and the birds are singing, and the insects are flying about, and the grass is green, and every thing appears pleasant, and you feel happy too, and have come, I suppose, to see old Uncle Philip.'

'Yes, Uncle Philip, we are tired of playing now, and so we have come to ask you to talk with us, and tell us about some of the curious things you know.'

'Well, boys, I will tell you about some very strange things. I will talk to you about animals that know how to work with tools like a man.'

'Work with tools, Uncle Philip! That is strange; but we know it is so, if you say so; because you will not tell us any stories but true ones. But where do they get the tools?'

'Ah, boys, 'the hand that made them is *divine!*' They get them where we get all that is useful and good,—from GOD. The Bible says that He '*is wise in heart, and wonderful in working;*' and he has made many a poor little insect, and given it tools to work with for its comfort, as good and perfect as any that man can make. Yes, these poor little creatures had tools long before man had. GOD cares for the insects, boys, as well as for us.'

'But, Uncle Philip, what sort of tools do you mean? Tell us about them.'

'Very well, I will; do you think of some kind of tools that men use? think of the carpenter and his tools, and let us see if we cannot find some of them among the insects.'

'Why, the carpenter has a saw. Is there any saw among these little fellows?

'Yes indeed, there is; and a capital saw it is. Now listen, and I well tell you all about it. There is a kind of fly called the *saw-fly;* it has four wings, and commonly its body is yellow, and its head is black; but the most curious part of it is the saw. The young ones feed upon the leaves of rose-bushes, and gooseberries, and raspberries, and currants, and several other kinds of bushes; and the old ones always lay their eggs on the branches of these bushes, so that the young ones may have something to eat as soon as they come out. It uses its saw to make a place in the branch to put its egg in.'

'Uncle Philip, what is the saw made of?'

'It is made of something like horn, and is fixed very nicely in a case; it resembles what the cabinet-makers call a *tenon-saw* more than it does the carpenter's common saw. The tenon-saw is made of a thin plate of steel, and has a stiff brass back, to keep it from bending. The brass back has a groove in it, and the saw is put in that groove, and then it is fastened to it. But the fly's saw is fixed in another way; there is a back to it too, but that back is not fastened to the saw. The groove is in the saw, and there is a ridge all along the back-piece, which just fits in the groove, and so the saw slides backwards and forwards, and the ridge always keeps it in its place. Besides all this, boys, the fly is better off than the cabinet-maker, for he uses only one saw at a time; but our little workman has two exactly alike, and they are so fixed that the creature first pushes out one, and when it is drawing that back, pushes out the other; so that it is all the time cutting, and does double work. I think the fly's saw is the best, too, for another reason. The saws of the carpenter and cabinet-maker have their teeth bent; first, one a little on one side, and then the next to it a little on the other side, and so on to the end of the saw; so that when sawing, the cut may be wide enough for the blade to move easily. Now the fly's saw has the teeth a little bent, or twisted, too; but it has something else: on the outside of every tooth there are a great many very small teeth, so that the outside of every one is just like a *rasp*, or *file*.'

'But, Uncle Philip, it must take them a great while to saw a very little cut; they are so small.'

'Yes, it does; but they persevere. It takes them more than an hour and a half to make one groove, and sometimes they will go on and make as many as six without stopping. That shows, boys, what perseverance will do.'

'And when it is done sawing, Uncle Philip, where does it keep its saws?'

'Oh, I told you they fitted in a case; but when the fly is done sawing, it uses the saws to put the egg in the place cut for it, and then it draws the saws almost entirely into the case, and drops upon the egg a sort of frothy stuff like a drop of soap-lather.'

'What is that for?'

'I suppose it is to glue the egg fast, or else to keep the juices in the bush from hurting it.'

'Well, this is a curious fly, Uncle Philip.'

'It is strange, boys, because you never heard of it before; but it is a cunning fly, as well as a curious one.'

'What does it do, Uncle Philip?'

'Why, when it is frightened, it will fold up its case and saws under its body, and draw up its legs, and pretend to be dead; and then it will not move, even if you stick a pin through it.'

'Can you tell us any thing more about this fly?

'Nothing very strange, boys; but we have found out *two* tools, I think, a saw and a rasp, and that is enough for one poor little fly to give us.'

---

### DR. URE ON INDIGO.

FROM the differences which exist in the nature and culture of the *indigofera*, and of its treatment by the manufacturer, the product, *indigo*, as found in commerce, differs remarkably in quality and chemical composition. In this respect, it forms a complete contrast to the simple crystalline product sugar. Besides impurities accidentally present, from a bad season, want of skill or care, the purest commercial indigo consists of no less than five constituents—1. *Indigo-blue*, a very singular vegetable compound of carbon, hydrogen, and oxigen, with fully ten per cent. of azote; 2. *Indigo-gluten*, a yellow, or brownish-yellow varnish, which differs from wheat-gluten by its solubility in water. It has the taste of osmazome, or of beef-soup, melts when heated, burns with flame, and affords an empyreumatic oil along with ammonia by distillation; 3. *Indigo-brown*. This constituent is more abundant than the preceding. It is extracted by a concentrated water of potash, made to act on powdered indigo, previously digested in diluted sulphuric acid. Chevreuil's indigo-green seems to have consisted of this substance, mixed with some alkaline matter, and indigo-blue; 4. *Indigo-red*. This is readily dissolved by boiling alcohol out of indigo previously subjected to the action of an acid or alkaline menstruum. The alcohol acquires a beautiful red tinge, and leaves by its evaporation the red principle in the form of a blackish-brown varnish; 5. *Phosphate of lime*. I have found the bone phosphate in notable quantity in some fine indigo, constituting another feature of resemblance between this vegetable and animal products. Hence, also, the charcoal of indigo is most difficult of incineration, and requires, for perfect combustion in some cases, the deflagratory powers of nitric acid. —[*Arcana of Science and Art.*

---

## QUESTIONS

### ON THE LAST NUMBER OF THE LYCEUM.

WHAT is the most striking object in the island of Sicily?

Which is the most extensive volcano, Etna or Vesuvius?

Of what extent is the base of each? also of the crater?

What trees grow in the vicinity of Etna?

What is the circumference of a chestnut tree in that vicinity?

Which is the oldest volcano, Etna or Vesuvius? which is mentioned by Homer?

Mention the time of some of the eruptions of Etna?

What are some of the ingredients in ink?

In what ways is ink liable to be injured in its quality?

What materials are used for coloring glass?

What coloring matter is used for red? and what for green?

What gas is always found in the atmosphere, besides oxigen and nitrogen?

Is the carbonic acid in the atmosphere increased or diminished by a fall of rain?

Is the number of fixed stars greater or less, than would be supposed by a common observer?

At what distance has the nearest fixed star been calculated to be?

Is there proof that the earth when in a chaos was in a liquid or solid state?

What are supposed to have been the solvents of the earth, when in a liquid state?

Whence do we derive the only authentic account of the creation of our earth?

Is the account given by Moses of the creation of our earth corroborated or annulled by the present appearance of the earth?

Has the earth been subject to constant changes since its creation, or is it unchangeable?

What instances of change can be mentioned?

Which was created first, the animal, vegetable, or mineral kingdom?

What was discovered in the neighborhood of Paris, to prove that the earth has undergone gradual changes?